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10/608,477	06/30/2003	Naoki Hagai	116403	7829

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

> A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
> - Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
> - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
> - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
> Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 August 2007*.

2a)☐ This action is **FINAL.**　　2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-24* is/are rejected.

7)☒ Claim(s) *4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☒ All　b)☐ Some * c)☐ None of:

　　　1.☒ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
　　Paper No(s)/Mail Date *3/19/2007, 8/1/2003*.

4) ☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

- This action is responsive to the following communication: a Response to Restriction/Election Requirement filed on 08/15/2007.

- The examiner has withdrawn the election of species requirement and has examined all the claims.

Response to arguments

Applicant's arguments, see pages 1-4, filed 8/15/2007, with respect to Response to Election/Restriction have been fully considered and are persuasive. The examiner respectfully withdraws the election of species requirement filed on 6/15/2007.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

   The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1 and 7, is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

   Claim 1, recites on page 73, line 5, the limitation "...each of at least one of the at least three relative density values..." The sentence is confusing and vague. Appropriate corrections are required.

   Claim 7, recites the limitation "lower threshold value that is lower than *the threshold value*". There is insufficient antecedent basis for "*the threshold value*"

in the claims (furthermore, the claim ends with a coma, there should be a period there instead). Appropriate corrections are required.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 21-24 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 21-24 are drawn to functional descriptive material NOT claimed as residing on a computer readable medium. MPEP 2106.IV.B.1(a) (Functional Descriptive Material) states:

"Data structures not claimed as embodied in a computer-readable medium are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer."

"Such claimed data structures do not define any structural or functional interrelationships between the data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized."

Claims 21-24, while defining a multilevel value output program, does not define a "computer-readable medium" and is thus non-statutory for that reasons. A computer program, can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claims to "a computer readable medium storing a computer program" in order to make the claims statutory.

"In contrast, a claimed computer-readable medium encoded with the data structure defines structural and functional interrelationships between the data structure

and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory." - MPEP 2106.IV.B.1(a)

Examiner Notes

Examiner cites particular paragraphs, columns and line numbers in the references as applied to the claims below for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested that, in preparing responses, the applicant fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-3 & 5-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Yamamoto, US 7,009,731.

Re claim 1, Yamamoto discloses a multilevel value output device (see column 1, lines 31-34), comprising: a relative density value storage portion that prestores therein at least three relative density values for at least three multilevel output values in one-to-one correspondence with each other (see column 1, lines 23-67), the at least three relative density values being defined dependently on a predetermined maximum density that is defined for a highest relative density value among the at least three relative density values (see column 1, line 23-column 2, line 38) (also see column 3, line 29-column 8, line 52); an input portion that receives an input value indicative of density of a pixel in an input image (see figures 1-5, 9-11; column 1, line 23-column 2, line 38; column 3, line 29-column 6, line 46); a corrected value calculation portion that calculates a corrected value by adding to the input value at least a part of an error value that has been generated by at least one pixel near to the subject pixel (see figures 1-11, 27-31; column 1, line 23-column 2, line 38; column 3, line 29-column 7, line 61); an output value generation portion that compares the corrected value with at least one of the at least two threshold values, that converts the corrected value into one of the at least three multilevel values based on the compared results, and that outputs a resultant multilevel output value (see figures 1-11, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61), the output value generation portion referring to the threshold value storage portion and setting one relative density value that corresponds to the output value (see figures 1-11, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61), the output value generation portion calculating a difference between the corrected

value and the relative density value and setting the calculated result as an error

value for the subject pixel (see column 1, lines 56-59; also see figures 1-11, 27-

31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61); and

an output-value generation control portion that, when the corrected value is close

to each of at least one of the at least three relative density values, reduces a

frequency, at which the output value generation portion converts the corrected

value into one multilevel output value that corresponds to the subject relative

density value, thereby reducing a frequency at which the error value for the

subject pixel becomes close to zero (see figures 1-11, 27-31; abstract; column 1,

line 23-column 3, line 4; column 3, line 29-column 8, line 52; column 9, line 63-

column 10, line 50).

Re claim 2, Yamamoto further discloses wherein the output-value generation

control portion includes; a corrected-value judging portion judging whether or not

the corrected value is close to any of the at least one of the at least three relative

density values (see figures 1-11, 27-31; column 1, line 23-column 3, line 4;

column 3, line 29-column 7, line 61); and a selective control portion that controls,

when the corrected value is not close to any of the at least one of relative density

value, the output value generation portion to convert the corrected value into one

multilevel output value based on the compared results (see figures 1-11, 27-31;

column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61), the

selective control portion controlling, when the corrected value is close to one of

the at least one relative density value, the output value generation portion to fail

to convert the corrected value into the one multilevel output value that

corresponds to the subject relative density value, thereby preventing the output

value generation portion from calculating the error value for the subject pixel as

being close to zero (see figures 1-11, 27-31; abstract; column 1, line 23-column

3, line 4; column 3, line 29-column 8, line 52; column 9, line 63-column 10, line

50).

Re claim 3, Yamamoto further discloses wherein when the corrected value is

close to one of the at least one relative density value, the selective control portion

controls the output value generation portion to convert the corrected value into a

multilevel output value other than the one multilevel output value that

corresponds to the subject relative density value (see figures 9-11; column 9, line

63-column 10, line 50).

Re claim 5, Yamamoto further discloses wherein the output-value generation

portion includes a threshold setting portion that sets the at least two threshold

values in a manner that the at least two threshold values are maintained as being

fixed regardless of changes of the input value (see figures 1-11, 27-31; column 1,

line 23-column 3, line 4; column 3, line 29-column 7, line 61).

Re claim 6, Yamamoto further discloses wherein the output value generation

portion converts the corrected value into each of at least one multilevel output

value that corresponds to the at least one relative density value when the

corrected value is between the at least two threshold values (see figures 3-5,13-

17, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line

61), wherein the output-value generation control portion includes a threshold

setting portion that sets, upon receipt of the input value, the at least two threshold values in a manner that the at least two threshold values become close to each other when the input value becomes close to the at least one relative density value (see figures 1-11, 13-17, 27-31; column 3, line 29-column 7, line 61; column 11, line 15-column 12, line 3).

Re claim 7, Yamamoto further discloses wherein the at least two threshold values include a higher threshold value and a lower threshold value that is lower than the threshold value (see figures 2, 7, 15, 17).

Re claim 8, Yamamoto further discloses wherein the threshold setting portion sets the higher threshold value and the lower threshold value in a manner that as the input value decreases in a higher range defined between the at least one relative density value and another relative density value that is higher than the subject is relative density value toward the at least one relative density value, the lower threshold value is maintained as fixed and the higher threshold value decreases smoothly toward the lower threshold value (see figures 1-8, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61; column 11, line 15-column 12, line 3).

Re claim 9, Yamamoto further discloses wherein the lower threshold value is maintained as fixed to an intermediate value between the at least one relative density value and still another relative density value lower than the at least one relative density value (see figures 1-8, 13-17, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61).

Re claim 10, Yamamoto further discloses wherein the threshold setting portion sets the higher threshold value and the lower threshold value in a manner that as the input value increases in a lower range defined between the at least one relative density value and another relative density value that is lower than the subject relative density value toward the at least one relative density value, the higher threshold value is maintained as fixed and the lower threshold value increases smoothly toward the higher threshold value (see figures 1-8, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61; column 11, line 15-column 12, line 3).

Re claim 11. Yamamoto further discloses wherein the higher threshold value is maintained as fixed to an intermediate value between the at least one relative density value and still another relative density value higher than the at least one relative density value (see figures 1-8, 13-17, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61; column 11, line 15-column 12, line 3).

Re claim 12, Yamamoto further discloses wherein the at least three multilevel output values include a highest multilevel output value, a second highest multilevel output value lower than the highest multilevel output value, a third highest multilevel output value lower than the second highest multilevel output value, and a lowest multilevel output value lower than the third highest multilevel output value (see fig. 5; column 6, lines 1-53), and wherein the at least three relative density values include a highest relative density value, a second highest relative density value lower than the highest relative density value, a third highest

relative density value lower than the second highest relative density value, and a lowest relative density value lower than the third highest relative density value (see column 5, line 5-column 6, line 53), the relative density value storage portion storing the highest, second highest, third highest, and fourth highest relative density values in one-to-one correspondence with the highest, second highest, third highest, and lowest multilevel output values, respectively (see figures 1-11, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61), wherein the threshold setting portion sets three threshold values that include a highest threshold value, a second highest threshold value lower than or equal to the highest threshold value, and a lowest threshold value lower than or equal to the second highest threshold value (see figures 1-11, 13-17, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61), wherein the output value generation portion outputs the highest multilevel output value when the corrected value is greater than the highest threshold value, outputs the second highest multilevel output value when the corrected value is between the highest threshold value and the second highest threshold value, outputs the third highest multilevel output value when the corrected value is between the second highest threshold value and the third highest threshold value, and outputs the lowest multilevel output value when the corrected value is smaller than the lowest threshold value (see figures 1-11, 13-17, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61), and wherein the threshold setting portion sets the highest threshold value and the second highest threshold value in a manner that the highest threshold value and the second highest threshold value

become close to each other when the input value becomes close to the second highest relative density value, and sets the second highest threshold value and the third highest threshold value in a manner that the second highest threshold value and the third highest threshold value become close to each other when the input value becomes close to the third highest relative density value (see figures 1-8, 14-17, 27-31; abstract; column 1, line 23-column 3, line 4; column 3, line 29-column 8, line 52; column 11, line 15-column 12, line 3).

Re claim 13, Yamamoto further discloses wherein the threshold setting portion sets the highest, second highest, and third highest threshold values in a manner that as the input value decreases in a highest range defined between the highest relative density value and the second highest relative density value from the highest relative density value toward the second highest relative density value, the highest threshold value decreases smoothly from the highest relative density toward a higher intermediate value between the second highest relative density value and the third highest relative density value, the second highest threshold value is maintained as fixed to the higher intermediate value, and the third highest threshold value is maintained as fixed to a lower intermediate value between the third highest relative density value and the lowest relative density value, as the input value decreases in a second highest range defined between the second highest relative density value and the third highest relative density value from the second highest relative density value toward the third highest relative density value, the highest threshold value is maintained as fixed to the higher intermediate value, the second highest threshold value decreases

smoothly from the higher intermediate value toward the lower intermediate value, and the third highest threshold value is maintained as fixed to the lower intermediate value, as the input value decreases in a third highest range defined between the third highest relative density value and the lowest relative density value from the third highest relative density value toward the lowest relative density value, the highest threshold value is maintained as fixed to the higher intermediate value, the second highest threshold value is maintained as fixed to the lower intermediate value, the third highest threshold value decreases smoothly from the lower intermediate value toward the lowest relative density value; and as the input value changes in a lowest range defined smaller than or equal to the lowest relative density value, the highest threshold value is maintained as fixed to the higher intermediate value, the second highest threshold value is maintained as fixed to the lower intermediate value, and the third highest threshold value is maintained as fixed to the lowest relative density value (see figures 1-8, 14-19, 27-31; abstract; column 1, line 23-column 3, line 4; column 3, line 29-column 8, line 52; column 11, line 15-column 12, line 3).

Re claim 14, Yamamoto discloses a multilevel value output device (see column 1, lines 31-34), comprising: a relative density value storage portion that prestores therein at least three relative density values for at least three multilevel output values in one-to-one correspondence with each other (see column 1, lines 23-67), the at least three relative density values being defined by normalizing the at least three multilevel output values based on a predetermined maximum density that is defined for a highest relative density value among the at least

three relative density values, the at least three relative density values including a

middle relative density value, a higher relative density value higher than the

middle relative density value, and a lower relative density value lower than the

middle relative density value (see figures 1-8, 27-31; column 1, line 23-column 2,

line 38; column 3, line 29-column 7, line 61), the at least three multilevel output

values including a middle multilevel output value, a higher multilevel output value

higher than the middle multilevel output value, and a lower multilevel output value

lower than the middle multilevel output value, the higher, middle, and lower

relative density values corresponding to the higher, middle, and lower multilevel

output values, respectively (see figures 1-8, 27-31; column 1, line 23-column 2,

line 38; column 3, line 29-column 7, line 61); an input portion that receives an

input value indicative of density of a pixel in an input image (see figures 1-5, 9-

11; column 1, line 23-column 2, line 38; column 3, line 29-column 6, line 46); a

corrected value calculation portion that calculates a corrected value by adding to

the input value at least a part of an error value that has been generated by at

least one pixel near to the subject pixel (see figures 1-11, 27-31; column 1, line

23-column 2, line 38; column 3, line 29-column 7, line 61); an output value

generation portion that compares the corrected value with at least one of the at

least two threshold values, the at least two threshold values including a higher

threshold value and a lower threshold value that is lower than the higher

threshold value (see figures 1-11, 27-31; column 1, line 23-column 3, line 4;

column 3, line 29-column 7, line 61), the output value generation portion

converting the corrected value into one of the at least three multilevel values

based on the compared results and outputting the resultant one multilevel output value (see figures 1-11, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61), the output value generation portion converting the corrected value into the higher multilevel output value when the corrected value is greater than the higher threshold value, the output value generation portion converting the corrected value into the middle multilevel output value when the corrected value is between the higher threshold value and the lower threshold value, the output value generation portion converting the corrected value into the lower multilevel output value when the corrected value is smaller than the lower threshold value (see figures 1-11, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61); a relative density setting portion that refers to the threshold value storage portion and that sets one relative density value that corresponds to the multilevel output value generated by the output value generation portion (see figures 1-11, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61); an error value calculation portion that calculates a difference between the corrected value and the relative density value set by the relative density setting portion, and that sets the calculated result as an error value for the subject pixel (see figures 1-11, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61); and a threshold setting portion that sets, upon receipt of the input value, the higher and lower threshold values in a manner that the higher and lower threshold values become close to each other when the input value becomes close to the middle relative density value (see figures 1-11, 14-19, 27-31; abstract; column 1, line 23-column 3, line

4; column 3, line 29-column 8, line 52; column 9, line 63-column 10, line 50; column 11, line 15-column 12, line 3).

Re claim 15, Yamamoto further discloses wherein the threshold setting portion sets the higher and lower threshold values in a manner that as the input value decreases from the higher relative density value toward the middle relative density value, the lower threshold value is maintained fixed while the higher threshold value decreases smoothly toward the lower threshold value (see figures 1-8, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61; column 11, line 15-column 12, line 3).

Re claim 16, Yamamoto further discloses wherein the threshold setting portion sets the higher and lower threshold values in a manner that as the input value decreases from the higher relative density value toward the middle relative density value, the lower threshold value is maintained fixed to an intermediate value between the middle relative density value and the lower relative density value while the higher threshold value decreases smoothly toward the intermediate value (see figures 1-8, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61; column 11, line 15-column 12, line 3).

Re claim 17, Yamamoto further discloses wherein the threshold setting portion sets the higher and lower threshold values in a manner that as the input value increases from the lower relative density value toward the middle relative density value, the higher threshold value is maintained fixed while the lower threshold value increases smoothly toward the higher threshold value (see

figures 1-8, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61; column 11, line 15-column 12, line 3).

Re claim 18, Yamamoto further discloses wherein the threshold setting portion sets the higher and lower threshold values in a manner that as the input value increases from the lower relative density value toward the middle relative density value, the higher threshold value is maintained fixed to an intermediate value between the middle relative density value and the lower relative density value while the lower threshold value increases smoothly toward the intermediate value (see figures 1-8, 27-31; column 1, line 23-column 3, line 4; column 3, line 29-column 7, line 61; column 11, line 15-column 12, line 3).

Re claim 19, claim 19 recites identical features, as claim 1, except claim 19 is a method claim. Thus, arguments made for claim 1 are applicable for claim 19.

Re claim 20, claim 20 recites identical features, as claim 14, except claim 20 is a method claim. Thus, arguments made for claim 14 are applicable for claim 20.

Re Claims 21-24, claims 21-24 recite identical features, as claims 19-20, except claims 21-24 merely deal with executing the method of claims 19-20 on a computer. Thus, arguments made for claims 19-20 are applicable for claims 21-24.

Allowable Subject Matter

Regarding claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not disclose, teach, or suggest the claimed inventions of (in combination with all other limitations in the claims), a random number generating portion generating a random number when the corrected value calculation portion calculates the corrected value for the subject pixel; and a random number judging portion judging whether or not the random number is equal to a predetermined number, wherein when the random number is equal to the predetermined number, the corrected-value judging portion executes its judging operation and the selective control portion executes its selective control operation, and when the random number is not equal to the predetermined number, the corrected-value judging portion fails to execute its judging operation and the selective control portion controls the output value generation portion to convert the corrected value into one multilevel output value based on the compared results as set forth in claim 4.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pawandeep S. Dhingra whose telephone

number is 571-270-1231. The examiner can normally be reached on M-F, 9:30-7:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Twyler Lamb can be reached on 571-272-7406. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TWYLER LAMB
SUPERVISORY PATENT EXAMINER

Pd
November 12, 2007